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UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

September 14, 2004

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APPLICATION NUMBER: *10/816,120*
FILING DATE: *April 01, 2004*

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17497 U.S. PTO
10/816120
040104

PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer No.: 23641

Attorney Docket No.: 26893/82699

Inventors: Dieter S. Gaubatz, et al.

Title: SYSTEM AND METHOD FOR EVALUATING PREFERRED RISK DEFINITIONS

Certificate Under 37 CFR 1.10

Express Mail Label No. EV 329 805 745 US

I hereby certify that this correspondence is being deposited with the United States Postal Service's "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated below and is addressed to: Mail Stop Patent Application, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450

on April 1, 2004

Dianne Neumann-Leatherman

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

1. ☒ **Fee Transmittal Form (e.g., PTO/SB/17)**
   (*Submit an original and a duplicate for fee processing*)
2. ☐ Applicant claims small entity status.
   See 37 CFR 1.27.
3. ☒ **Specification** [Total Pages 26]
   (*preferred arrangement set forth below*)
   - Descriptive title of the invention
   - Cross Reference to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to sequence listing, a table, or a computer program listing appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings (if filed)
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
4. ☒ **Drawing(s) (35 U.S.C. 113)** [Total Sheets 4]
5. ☒ **Oath or Declaration** [Total Pages 4]
   a. ☒ **Informal**
   b. ☐ Copy from a prior application (37 CFR 1.63(d))
      (*for continuation/divisional with Box 18 completed*)
      i. ☐ DELETION OF INVENTOR(S)
      Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ Application Data Sheet. See 37 CFR 1.76
7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
8. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ paper
   c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney (when there is an assignee)
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure Statement (IDS)/PTO-1149 ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☒ **Return Receipt Postcard (MPEP 503)** (Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. ☒ **Other:** Check in the amount of $1,496.00

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: ____/_____

Prior application information: Examiner: _____ Group/Art Unit: _____

For CONTINUATION OR DIVISIONAL APPLICATIONS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

Bobby B. Gillenwater
Reg. No. 31,105

Date: April 1, 2004

Send Fees and Completed Form to:

Mail Stop Patent Application
Commissioner of Patents
P. O. Box 1450
Alexandria, VA 22313-1450

FWDS01 BBG 179866_1
Rev. (08/03)

BARNES & THORNBURG

600 One Summit Square
Fort Wayne, Indiana 46802
(260) 423-9440

PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer No.:	23641
Application No.:	
Confirmation No.:	
Filing Date:	April 1, 2004
Group Art Unit:	Unknown
Examiner Name:	Unknown
Attorney Docket No.:	26893/82699
Inventors:	Dieter S. Gaubatz et al.
Title:	SYSTEM AND METHOD FOR EVALUATING PREFERRED RISK DEFINITIONS

Certificate Under 37 CFR 1.10

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on April 1, 2004

Dianne Neumann-Leatherman

FEE TRANSMITTAL FOR FY 2004

TOTAL AMOUNT OF PAYMENT: $ 1,496.00

METHOD OF PAYMENT

1. ☒ The Commissioner is hereby authorized to charge any additional fee required under 37 CFR 1.16 and 1.17 and credit any overpayments to:

   Deposit Account Number: 02-1010 (26893/82699)
   Deposit Account Name: Barnes & Thornburg

   ☐ Applicant claims small entity status. See 37 CFR 1.27

2. ☒ **Check** ☐ Credit Card ☐ Money Order ☐ Other ☐ None

FEE CALCULATION

1. Basic Filing Fee:

Large Fee Code	Entity Fee	Small Fee Code	Entity Fee	Fee Description	Fee Paid
1001	$770.00	2001	$385.00	Utility Filing Fee	770.00
1002	$340.00	2002	$170.00	Design Filing Fee	
1007	$340.00	2007	$170.00	Design Filing Fee (CPA)	
1003	$530.00	2003	$265.00	Plant Filing Fee	
1004	$770.00	2004	$385.00	Reissue Filing Fee	
1005	$160.00	2005	$80.00	Provisional Filing Fee	
				SUBTOTAL (1)	770.00

2. Extra Claim Fees:

			Extra Claims		Fee from Below		Fee Paid
Total Claims	46	-20**=	26	x	18.00	=	468.00
Independent Claims	6	- 3**=	3	x	86.00	=	258.00
Multiple Dependent Claim						=	0.00
					SUBTOTAL (2)		726.00

Large Fee Code	Entity Fee	Small Fee Code	Entity Fee	Fee Description
1202	$18.00	2202	$9.00	Claims in excess of 20
1201	$86.00	2201	$43.00	Independent claims in excess of 3
1203	$290.00	2203	$145.00	Multiple dependent claims, if not paid
1204	$86.00	2204	$43.00	** Reissue independent claims over original patent
1205	$18.00	2205	$9.00	** Reissue claims in excess of 20 and over original patent

** or number previously paid, if greater; For Reissues, see above. For multiple dependent claims, pay fee only once no matter how many multiple dependent claims you have.

3. Additional Fees:

Large Fee Code	Entity Fee	Small Fee Code	Entity Fee	Fee Description	Fee Paid
1051	$130.00	2051	$65.00	Surcharge - late filing fee or oath	
1052	$50.00	2052	$25.00	Surcharge - late provisional filing fee or cover sheet	
1053	$130.00	1053	$130.00	Non-English specification	
1812	$2,520.00	1812	$2,520.00	For filing a request for ex parte reexamination	
1804	$920.00*	1804	$920.00*	Requesting publication of SIR prior to Examiner action	
1805	$1,840.00*	1805	$1,840.00*	Requesting publication of SIR after to Examiner action	

1251	$110.00	2251	$55.00	Extension for reply within first month	
1252	$420.00	2252	$210.00	Extension for reply within second month	
1253	$950.00	2253	$475.00	Extension for reply within third month	
1254	$1,480.00	2254	$740.00	Extension for reply within fourth month	
1255	$2,010.00	2255	$1,005.00	Extension for reply within fifth month	
1401	$330.00	2401	$165.00	Notice of Appeal	
1402	$330.00	2402	$165.00	Filing a brief in support of an appeal	
1403	$290.00	2403	$145.00	Request for oral hearing	
1451	$1,510.00	1451	$1,510.00	Petition to institute a public use proceeding	
1452	$110.00	2452	$55.00	Petition to revive - unavoidable	
1453	$1,330.00	2453	$665.00	Petition to revive - unintentional	
1501	$1,330.00	2501	$665.00	Utility issue fee	
1502	$480.00	2502	$240.00	Design issue fee	
1503	$640.00	2503	$320.00	Plant issue fee	
1504	$300.00	1504	$300.00	Publication Fee for early, voluntary, or normal Publication	
1460	$130.00	1460	$130.00	Petitions to the Commissioner	
1807	$50.00	1807	$50.00	Processing fee for provisional applications	
1806	$180.00	1806	$180.00	Submission of Information Disclosure Statement	
8021	$40.00	8021	$40.00	Recording each patent assignment per property (times number of properties)	
1809	$770.00	2809	$385.00	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	$770.00	2810	$385.00	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	$770.00	2801	$385.00	Request for Continued Examination (RCE)	
1802	$900.00	1802	$900.00	Request for expedited examination of a design application	

Other fee (specify): _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) 0.00

Bobby B. Gillenwater
Reg. No. 31,105

Date: April 1, 2004

FWDS01 BBG 179865

(Rev. 10/03)

Express Mail No. EV 329 805 745 US
Attorney Docket No. 26893-82699

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTORS: GAUBATZ, DIETER S.
WRIGHT, EDWARD J.
CHOKA, TRACY A.
EUBANK, JAMES P.

INVENTION: SYSTEM AND METHOD FOR EVALUATING PREFERRED RISK DEFINITIONS

Barnes & Thornburg
600 One Summit Square
Fort Wayne, Indiana 46802
(260) 423-9440

SPECIFICATION

To All Whom It May Concern:

Be it known that Dieter S. Gaubatz of 3024 Emerald Lake Drive, Fort Wayne, Indiana 46804; a citizen of Canada; Edward J. Wright of 633 Currie Hill Street, Fort Wayne, Indiana 46804, a citizen of the United States of America; Tracy A. Choka of 1220 Korte Lane, Fort Wayne, Indiana 46807, a citizen of the United States of America, and James P. Eubank of 2022 Ardmore Road, Apt. 104, Fort Wayne, Indiana 46802, a citizen of the United States of America, have invented certain new and useful improvements in a

SYSTEM AND METHOD FOR EVALUATING PREFERRED RISK DEFINITIONS

of which the following is a specification.

SYSTEM AND METHOD FOR EVALUATING PREFERRED RISK DEFINITIONS

TECHNICAL FIELD

This invention relates generally to risk management and, more particularly to methods and systems for characterizing relative risks based on a plurality of preferred risk criteria. The invention may be used in connection with the design, development and/or pricing of financial products, including (but not necessarily limited to) insurance products.

BACKGROUND AND SUMMARY

One aspect of risk management typically involves consideration of one or more criteria which are correlated to an event or events of interest. The ability to predict the frequency or eventual likelihood of occurrence of events of interest has value and utility in many settings.

It is often the case that different entities may use different sets of criteria to predict the expected occurrence of the same (or similar) events. In some cases, the same entity may also use different criteria sets in differing situations or differing times. Methods and systems for comparing different criteria sets are useful tools in the selection of criteria and the design and development of related products.

These considerations are applicable in the marketplace for financial products and services. This is particularly true in the field of insurance. The following discussion deals particularly with applications of such methods and systems in the field of life insurance. However, in its broader aspects, the methods and systems disclosed are applicable to other types of insurance, and to other financial products which involve risk

management (e.g., pricing and evaluation of different sets of criteria that might be used in the design and development of property insurance, mortgages, credit, securities, etc.).

Life (and health) insurance products are continuously evolving. A relatively recent trend in the field of life insurance has been the increased emergence of "preferred" products. These are products regarding which the mortality expectations are lower than the expectations for "standard lives" (i.e., the average mortality expectations for a healthy population). Insurance companies provide preferred products to those individuals and/or groups which can meet selected criteria considered indicative of low mortality.

As noted, it is not uncommon for different entities (i.e., insurance companies) to use different criteria sets to identify those available for preferred coverages, and/or different cut-points for designating the levels of one or more criteria associated with preferred mortality. Thus, comparing the products from competing companies, or designing new preferred products to replace or augment existing products, can be difficult without use of a methodology which takes such differences into account. Such comparisons may be especially useful in the selection of criteria and pricing of related products, and in determining the impact of criteria changes or granting various exceptions to criteria on pricing and potential profitability of such products.

In its broader aspects, certain embodiments of the present invention are directed to computerized methods and systems of characterizing relative risks, such as mortality risks, for a plurality of financial products, such as preferred insurance products. One or more of these embodiments may include the steps of identifying one or more risk classes associated with the plurality of products; determining for each of the risk classes an expected occurrence rate; dividing the expected rates by an average rate for standard

risks to determine a relative risk ratio for each of the risk classes; and comparing the relative risk ratios to characterize the relative risks associated with the plurality of products.

Additional aspects and features will become apparent to those skilled in the art upon consideration of the following detailed description of the illustrated embodiments exemplifying the best mode of carrying out the invention as presently perceived, and the claims which follow the detailed description.

BRIEF DESCRIPTION OF DRAWINGS

The present invention will be described hereafter with reference to the attached drawings which are given as non-limiting examples only, in which:

Figure 1 is a flowchart which illustrates a portion of one embodiment of a method and system for characterizing relative risks.

Figure 2 is a continuation of the flowchart of Figure 1.

Figure 3 is a continuation of the flowcharts of Figures 1 and 2.

Figure 4 is a continuation of the flowchart of Figure 3.

DETAILED DESCRIPTION OF THE DRAWINGS

Figure 1 is a flowchart which illustrates a portion of one embodiment of a method/system for characterizing relative risks. In this example, the subject risks are mortality risks, and more specifically mortality risks which are based on a plurality of preferred risk criteria. The embodiment illustrated by this and the other figures can be

used, for example, to compare and evaluate preferred risk classifications used by different insurance companies in connection with their respective products. In such an instance, different criteria are often used by one or more of the companies in determining which risks are deemed preferred. Use of the embodiment illustrated in the figures allows for comparison of preferred insurance products, notwithstanding the differences in the preferred criteria used by different companies. The system and method illustrated may also be used by an individual company in the design and/or pricing of a product, and in the evaluation of individual risk exceptions, as is described more fully below in connection with the figures.

With reference to Figure 1, the first step illustrated by process block 10 relates to conducting or gathering prevalence research. "Prevalence" is the rate of occurrence of a criterion (or criteria) among an insured population. For example, if one of the preferred criterion is systolic blood pressure, information relating to the prevalence of systolic blood pressure levels, and to the levels used as "cut-points" or limits in classifying an individual risk as standard or preferred, is gathered and entered.

Block 12 illustrates the step of acquiring prevalence data relating to an insured population. For example, a large laboratory dataset of insured applicants can be studied to collect prevalence information related to systolic blood pressure.

The next "step" in the process is actually two steps illustrated by blocks 14 and 16. The operations represented by these blocks may be performed simultaneously, or in any desired order. Block 14 illustrates the step of determining the prevalence of preferred criteria within an insured cohort. A cohort is a risk classification which represents a range of incremental probabilities of occurrence of an insurable event.

Accordingly, the operation illustrated by block 14 is a determination of the rate of occurrence of the subject criteria among the members of a particular risk classification.

The operation illustrated by block 16 relates to calculation of correlations which may exist among various ones of the preferred criteria. The term "correlations" is not used in the narrow mathematical sense of a particular second order moment of a probability distribution. Rather, this term is used in a sense intended to indicate the presence of, or a measure of, the dependence between two or more variables (in this case, two or more preferred criteria). In some instances, one or more criteria may be highly correlated with one another. In such instances, the impact of such criteria may be somewhat redundant. This type of correlation is discussed in additional detail in U.S. Patent Application Serial No. 10/291,301 filed November 8, 2002, which is commonly assigned to the assignee of the present application. To the extent necessary for a full understanding and appreciation of the present invention, the entirety of U.S. Patent Application Serial No. 10/291,301 is hereby incorporated into this discussion by this reference thereto.

The next step, represented by block 18, is the determination of prevalence for all combinations of correlated criteria. In other words, a numerical representation of the prevalence within a population is determined for each unique combination of criteria.

With reference to the operation represented by block 20, if particular combinations of criteria result in non-credible or aberrant results, adjustments will be made. With further reference to U.S. Patent Application Serial No. 10/291,301, it is explained that a probability of occurrence can be determined for each combination of criteria. These values can be arranged in the form of a matrix having dimensions equal to the number of preferred criteria being considered. Each location in the matrix is a "cell"

containing a value specific to a particular combination of criteria. The operation represented by block 20 is provided in recognition of the fact that, in such a matrix, inconsistencies can result in the values generated for certain combinations. In that event, the value in the aberrant cell is replaced with a value that is consistent with the pattern established by adjacent, credible cells.

The results of this determination are then compared to the empirical data available from multi-company studies. This operation is represented by decision block 22. If the prevalence of certain combinations vary with what has been observed in credible studies, adjustments are made to match the study results. This operation is represented by process block 24. If this adjustment process results in anomalies within the matrix, such anomalies are detected and corrected in the operation represented by block 20. When the prevalence results match the empirical evidence, the prevalence results are stored, as indicated by storage operation 50 (Figure 3). As indicated, the prevalence results for each combination of preferred criteria are stored by issue age, gender, smoking status, and duration.

Figure 2 shows another portion of one embodiment of the subject process for characterizing risks. The portion of the process illustrated in Figure 2 may be performed before, after, or contemporaneously with the portion of the process discussed in connection with Figure 1. The portion of the process illustrated by Figure 2 relates to relative mortality (i.e., rate of death among preferred classes divided by standard mortality). The first step illustrated by block 30 relates to conducting or gathering data from mortality research. This body of research includes information specific to each of the preferred criteria being considered. The review of this information is represented in

Figure 2 by block 32. In addition, other clinical/epidemiological data generally available in connection with the subject preferred criteria are reviewed (block 34).

Based on these reviews, a relative mortality rate for each of the criteria is calculated (block 36). As in the case with prevalence data, correlations in mortality data among the various criteria are also calculated (block 38). Finally, relative mortality rates are determined for all combinations of correlated criteria (block 40). Following these operations, any anomalies in the data are identified and resolved or "smoothed" (block 42). The relative mortality rates determined for the combinations are compared with data from multi-company studies to determine whether the rates match the empirical data. This operation is represented in Figure 2 by decision block 44. To the extent that the determined rates do not match the empirical evidence, adjustments to the relative mortality rates are made to match the empirical results. This operation is represented by block 46. Following adjustments, the data are checked for anomalies and any that occur are corrected (block 42). When the relative mortality data is consistent with data from the multi-company studies, the data are stored as indicated by storage operation 50 of Figure 3. As with the prevalence data, the relative mortality results are stored for each correlated, preferred combination by issue age, gender, smoking status and duration.

With further reference to Figure 3, after storing the prevalence and relative mortality results for each correlated combination of preferred criteria (storage operation 50), the process proceeds as indicated in Figure 3 by determining a specific base-preferred criteria set to study (block 52). Determination of the criteria in this step is usually client or company specific. That is, the criteria used by a particular company or insurance product to identify a preferred risk is determined, and the subject process is used to calculate a base relative risk ratio ("RRR") for this combination.

After determining the base criteria, prevalence and relative mortality data are extracted from storage for such criteria (block 54). After extraction of this data, an RRR for each risk class by age, gender and duration is calculated as indicated by block 56. A specific formula for calculating RRR is set forth in detail below. Calculations for each risk class are based on both prevalence and relative mortality data, as well as on the preferred criteria defining each risk class.

The results of the calculation illustrated by block 56 are stored as indicated by storage operation 58. The system then provides a user with the opportunity to evaluate alternative scenarios (decision block 60). Examples of alternative scenarios are illustrated by process blocks 62-72. These include changing preferred criteria cut-point limits (62), adding new criteria (64), removing criteria (66), adding one or more new preferred risk classes (68), removing one or more existing preferred risk classes (70), and changing the preferred classification system (72). If alternative scenarios are evaluated, new criteria specific prevalence and relative risk ratios are calculated (block 74). The base criteria prevalence and relative risk ratio results are extracted from the data previously stored (58), and the newly calculated prevalence and RRR results for the new criteria are compared to the results using the base criteria. These operations are represented in Figure 3 by blocks 76 and 78. The process then determines whether the changes are acceptable (decision block 80). If so, the results for the new criteria are stored (58). If the results are not acceptable, changes can be made and additional scenarios reflecting such changes can be evaluated.

After evaluation of all desired alternative scenarios, or if no alternative scenarios are to be evaluated, the process proceeds as illustrated in the flow chart of Figure 4. The results stored in storage operation 58 may optionally be compared to

known results available in the relevant industry or market. This option is represented in Figure 4 by decision block 82. In one application, the results relating to criteria used by a client firm can be compared to those of the industry to evaluate the competitiveness of the client firm's risk classifications. This operation is represented in Figure 4 by block 84. If the results of the comparison are acceptable, the process proceeds as indicated by the "yes" branch exiting decision block 86. If the results of the comparison are not acceptable (e.g., the compared criteria are not deemed competitive), the process allows for the evaluation of alternatives, as previously discussed.

If the results of the comparison are acceptable, or if no comparisons are made, the process proceeds as indicated at block 88. That is, client specific prevalence and RRR data are extracted from storage, and are used to calculate pricing mortality (block 90). Baseline mortality rates may be produced in the form of a document (92), and mortality rates are stored as indicated in storage operation 94. The stored mortality rates may be used in comparing the client's actual mortality experience against expected mortality experience and for the development of product pricing.

The RRR results may also be used for evaluating preferred exceptions, as indicated at decision block 96. If that is the case, an RRR is calculated for an individual applicant to determine the impact such exception would have on mortality of the risk class (block 98). The average RRR for the risk class is extracted (block 100) and compared to the RRR of the individual applicant (block 102). As indicated by decision block 104, if the individual RRR is less than or equal to the average RRR for the risk class, the exception may be allowed (block 106). If the individual RRR is greater than the average RRR for the risk class, the exception may be rejected (block 108).

Calculation of RRRs for an individual applicant can also be performed using subcategories of criteria (e.g., medical criteria, personal/family history criteria, violent deaths, etc.). Decisions to include individuals in, or exclude individuals from, a preferred class can be made based on one or more of the RRRs from the subcategories. This tool will allow an insurer to accept relatively good risks that might otherwise have been rejected due to a failure to meet a particular criteria, or to reject relatively bad risks which might otherwise be accepted (e.g., by an individual marginally qualified under many of the criteria). Use of this tool is not limited to any specific group or subcategory of criteria. In the life insurance context, such analyses can be made regarding criteria such as motor vehicle reports, participation in hazardous sports or activities, aviation activities, foreign travel, etc. Indeed, virtually any factor that affects the mortality risk of an individual, either positively or negatively, can be incorporated into this tool when evaluating the overall appropriateness of including that individual in a preferred risk classification.

In the event RRR results are not used to evaluate preferred exceptions, the process ends, as indicated by terminal block 110. It should be noted that a new product development cycle can begin for the same client at decision operation 60 as an evaluation of an alternative scenario. Barring substantial changes in data, there would be no reason to repeat the preceding steps and operations illustrated.

RRR FORMULA

The relative risk ratio for a particular preferred class reflects the mortality rate of that risk class relative to the overall average rate for the full distribution of risks classified as "standard lives" through the underwriting process. The RRR varies by gender, issue age, smoking status, preferred risk class and duration.

A particular risk class (R^l) can be defined by the following "n" criterion:

Preferred Risk Factor	Global Min	Class Min	Class Max	Global Max
Risk Criterion 1	1	a	b	c
Risk Criterion 2	1	d	e	f
.				
.				
.				
Risk Criterion k	1	l	m	n
.				
.				
.				
Risk Criterion n	1	x	y	z

Let $M_{pq...s...t}$= The relative mortality rate for individuals who have a value of "p" for Risk Criterion 1, "q" for Risk Criterion 2, ..., "s" for Risk Criterion k,..., and "t" for Risk Criterion n.

Let $P_{pq...s...t}$= The relative prevalence for individuals who have a value of "p" for Risk Criterion 1, "q" for Risk Criterion 2, ..., "s" for Risk Criterion k,..., and "t" for Risk Criterion n.

Using a splinter type formula, the RRR can be expressed as the ratio of R^l divided by R:

where:

for (p = a to b) (q = d to e) (s = l to m) (t = x to y)

$R^l = (\sum(M_{pq...s...t} * P_{pq...s...t}))$ divided by $\sum P_{pq...s...t}$

and

for (p = 1 to c) (q = 1 to f) (s = 1 to n) (t = 1 to z)

$R = (\sum(M_{pq...s...t} * P_{pq...s...t}))$ divided by $\sum P_{pq...s...t}$

There is a relationship between the values in the incremental or splinter matrix described in U.S. Patent Application Serial No. 10,291,301 and the RRR referred to above. Each of the values in the multi-dimensional splinter matrix could be defined as the RRR for a specific individual or individuals exactly meeting the criteria associated with that position in the matrix. In the context of the present application (e.g., comparing one preferred product based on criteria set A with another preferred product based on criteria set B, the comparisons of RRRs are comparable to comparing one group of splinters to another group of splinters.

An example may help to illustrate this aspect. Consider nine individuals having different diastolic and systolic blood pressure readings, as indicated in Table 1. Assume that the splinter value (or individual RRR) associated with these readings is as listed in the right-most column of Table 1 (the numbers in the table are exaggerated for purposes of illustration):

DBP	SBP	Splinter Mortality
70	130	85.0%
71	130	95.0%
72	130	110.0%
70	131	86.0%
71	131	96.0%
72	131	111.0%
70	132	87.0%
71	132	97.0%
72	132	112.0%

The right-most column headed "Splinter Mortality" represents the mortality of an individual with the exact blood pressure readings listed in the center and left-most columns, relative to "standard" mortality (i.e., the average mortality for a healthy group of people). Thus, an individual having a 70 DBP and 130 SBP would have

a mortality of 85% times standard mortality. Assume company A provides a preferred product having a criteria which includes a DBP of less than or equal to 70, and company B provides a preferred product having a criteria which includes an SBP of less than or equal to 130. From this universe of nine individuals, company A's RRR would be the combination of three splinters (130/70, 131/70 and 132/70) or 86% (i.e., (85+86+87)/3). Company B's RRR would also be the combination of three splinters (130/70, 130/71 and 130/72) or 96.7% (i.e., (85+95+110)/3). Although both companies have 33% of the entire group qualifying for their respective preferred products, company A could offer a better premium. In this example, company B may actually "lose" the individual with the 130/70 readings, as that individual could go to company A to receive the benefit of the lower premium. This would cause company B's mortality to increase further.

Given the wide spectrum of preferred criteria considered by various companies, and the relatively large numbers of criteria underlying individual products, such comparisons between competing companies and/or products would be difficult without a formal and computerized methodology. This simplified example was merely intended to illustrate the principle involved.

The method and system may be implemented using readily available computer technology, including input and output devices, a processor, and data storage units. The operation of the system is controlled by program code which implements the methodology illustrated by the enclosed flow charts. There is no requirement that the method and system comprise a single machine or that all components of the system be located in the same physical location. Alternatively, the method and system may be realized as a special purpose device or machine designed specifically for implementing the subject invention.

Although the invention has been described with reference to particular means and embodiments, one skilled in the art can ascertain the essential characteristics of the invention. Various changes and modifications may be made to adapt the invention to various uses and environments without departing from the spirit and scope of the invention, as set forth in the following claims.

WHAT IS CLAIMED IS:

1. A computerized method of characterizing relative risks associated with a plurality of financial products, comprising the steps of:

a) identifying one or more risk classes associated with the plurality of financial products;

b) determining, for each of the risk classes, an expected occurrence rate;

c) dividing the expected occurrence rates determined in step b by an average rate to determine a relative risk ratio for each of the risk classes; and

d) comparing the relative risk ratios to characterize the relative risks associated with the plurality of products.

2. The computerized method of Claim 1, wherein said one or more risk classes are associated with one or more criteria, and further comprising the steps of modifying one or more of said criteria and repeating steps b, c and d to determine an impact of said modification on the relative risks associated with the products.

3. The computerized method of Claim 1, wherein one or more of said risk classes are associated with different criteria, and wherein said relative risk ratios are used to compare said risk classes.

4. The computerized method of Claim 1, further comprising the step of using the relative risk ratio to redefine one or more of said risk classes.

5. The computerized method of Claim 1, further comprising the step of determining a separate relative risk ratio for sub-groups of risks.

6. The computerized method of Claim 1, further comprising the step of storing data relating to prevalence of criteria associated with said risk classes for use in determining the relative risk ratios.

7. The computerized method of Claim 6, further comprising the steps of comparing the prevalence data to industry empirical data for particular combinations of criteria and, if necessary, adjusting the stored data to agree with the empirical data.

8. The computerized method of Claim 1, further comprising the step of storing data relating to the expected occurrence rates for use in determining the relative risk ratios.

9. The computerized method of Claim 8, further comprising the steps of comparing the stored data to industry empirical data and, if necessary, adjusting the stored data to agree with the empirical data.

10. The computerized method of Claim 2, further comprising the step of using the relative risk ratio to determine an impact on a risk class of including in that class one or more risks that do not meet one or more of the criteria associated with that class.

11. A method of characterizing relative mortality risks for a plurality of preferred insurance products, comprising the steps of:

a) identifying one or more preferred risk classes associated with the

plurality of preferred insurance products;

b) determining, for each of the preferred risk classes, an expected mortality rate;

c) dividing the expected mortality rates determined in step b by an average mortality rate for standard risks to determine a relative preferred risk ratio for each of the preferred risk classes; and

d) comparing the relative preferred risk ratios to characterize the relative mortality risks for the plurality of products.

12. The method of Claim 11, wherein said one or more preferred risk classes are associated with one or more underwriting criteria, and further comprising the steps of modifying one or more of said criteria and repeating steps b, c and d to determine an impact of said modification on the relative mortality risks for the products.

13. The method of Claim 11, wherein one or more of said preferred risk classes are associated with different underwriting criteria, and wherein said relative preferred risk ratios are used as a standard to compare said risk classes.

14. The method of Claim 11, further comprising the step of using the relative preferred risk ratio to redefine one or more of said preferred risk classes.

15. The method of Claim 11, further comprising the step of determining a separate relative preferred risk ratio for sub-groups of risks, based on at least one of gender, issue age, smoking status and policy duration.

16. The computerized method of Claim 11, further comprising the step

of storing data relating to prevalence of criteria associated with said risk classes for use in determining the preferred relative risk ratios.

17. The computerized method of Claim 16, further comprising the steps of comparing the prevalence data to industry empirical data for particular combinations of criteria and, if necessary, adjusting the stored data to agree with the empirical data.

18. The computerized method of Claim 11, further comprising the step of storing data relating to the expected occurrence rates for use in determining the relative risk ratios.

19. The computerized method of Claim 18, further comprising the steps of comparing the stored data to industry empirical data and, if necessary, adjusting the stored data to agree with the empirical data.

20. The computerized method of Claim 12, further comprising the step of using the preferred relative risk ratio to determine an impact on a preferred risk class of including in that class one or more risks that do not meet one or more of the criteria associated with that class.

21. A computerized system for characterizing relative risks associated with a plurality of financial products, comprising:

a) means for identifying one or more risk classes associated with the plurality of financial products;

b) means for determining, for each of the risk classes, an expected

occurrence rate;

c) means for dividing the expected occurrence rates by an average rate to determine a relative risk ratio for each of the risk classes; and

d) means for comparing the relative risk ratios to characterize the relative risks associated with the plurality of products.

22. The computerized system of Claim 21, wherein said one or more risk classes are associated with one or more criteria, and further comprising means for modifying one or more of said criteria and re-determining the relative risk ratio to determine an impact of said modification on the relative risks associated with the products.

23. The computerized system of Claim 21, wherein one or more of said risk classes are associated with different criteria, and wherein said relative risk ratios are used to compare said risk classes.

24. The computerized system of Claim 21, further comprising means for using the relative risk ratio to redefine one or more of said risk classes.

25. The computerized system of Claim 21, further comprising means for determining a separate relative risk ratio for sub-groups of risks.

26. The computerized system of Claim 21, further comprising means for storing data relating to prevalence of criteria associated with said risk classes for use in determining the relative risk ratios.

27. The computerized system of Claim 26, further comprising means

for comparing the prevalence data to industry empirical data for particular combinations of criteria and means for adjusting the stored data to agree with the empirical data.

28. The computerized system of Claim 21, further comprising means for storing data relating to the expected occurrence rates for use in determining the relative risk ratios.

29. The computerized system of Claim 28, further comprising means for comparing the stored data to industry empirical data and means for adjusting the stored data to agree with the empirical data.

30. The computerized system of Claim 21, wherein said one or more risk classes are associated with one or more criteria, and further comprising means for using the relative risk ratio to determine an impact on a risk class of including in that class one or more risks that do not meet one or more of the criteria.

31. A system for characterizing relative mortality risks for a plurality of preferred insurance products, comprising:

a) means for identifying one or more preferred risk classes associated with the plurality of preferred insurance products;

b) means for determining, for each of the preferred risk classes, an expected mortality rate;

c) means for dividing the expected mortality rates by an average mortality rate for standard risks to determine a relative preferred risk ratio for each of the preferred risk classes; and

d) means for comparing the relative preferred risk ratios to characterize the relative mortality risks for the plurality of products.

32. The system of Claim 31, wherein said one or more preferred risk classes are associated with one or more underwriting criteria, and further comprising means for modifying one or more of said criteria and re-determining the relative risk ratio to determine an impact of said modification on the relative mortality risks for the products.

33. The system of Claim 31, wherein one or more of said preferred risk classes are associated with different underwriting criteria, and wherein said relative preferred risk ratios are used as a standard to compare said risk classes.

34. The system of Claim 31, further comprising means for using the relative preferred risk ratio to redefine one or more of said preferred risk classes.

35. The system of Claim 31, further comprising means for determining a separate relative preferred risk ratio for sub-groups of risks, based on at least one of gender, issue age, smoking status and policy duration.

36. The system of Claim 31, further comprising means for storing data relating to prevalence of criteria associated with said risk classes for use in determining the preferred relative risk ratios.

37. The system of Claim 36, further comprising means for comparing the prevalence data to industry empirical data for particular combinations of criteria and means for adjusting the stored data to agree with the empirical data.

38. The system of Claim 31, further comprising means for storing data relating to the expected occurrence rates for use in determining the relative risk ratios.

39. The system of Claim 38, further comprising means for comparing the stored data to industry empirical data and means for adjusting the stored data to agree with the empirical data.

40. The system of Claim 31, wherein said one or more preferred risk classes are associated with one or more underwriting criteria, and further comprising means for using the preferred relative risk ratio to determine an impact on a preferred risk class of including in that class one or more risks that do not meet one or more of the underwriting criteria.

41. A method of evaluating an individual risk for inclusion in, or exclusion from, a preferred risk class associated with an insurance product comprising the steps of:

a) identifying one or more risk classes associated with the insurance product;

b) determining, for at least one of the risk classes, a relative risk ratio;

c) determining, for an individual risk, a relative risk ratio; and

d) comparing the relative risk ratio of the individual to the relative risk ratio of the risk class to determine whether to include the individual risk in, or exclude the individual risk from, the risk class.

42. The method of Claim 41, wherein one or more of said risk classes are associated with a plurality of criteria, and further comprising the step of determining relative risk ratios for subgroups of criteria.

43. The method of Claim 42, wherein the step of comparing the relative risk ratio of the individual to the relative risk ratio of the risk class comprises comparing the relative risk ratio of the individual to one or more of the relative risk ratios determined for the subgroups of criteria.

44. A computerized system for evaluating an individual risk for inclusion in, or exclusion from, a risk class associated with a financial product, comprising:

a) means for identifying one or more risk classes associated with the financial product;

b) means for determining, for at least one of the risk classes, a relative risk ratio;

c) means for determining, for an individual risk, a relative risk ratio; and

d) means for comparing the relative risk ratio of the individual to the relative risk ratio of the risk class to determine whether to include the individual risk in, or exclude the individual risk from, the risk class.

45. The computerized system of Claim 44, wherein one or more of said risk classes are associated with a plurality of criteria, and further comprising means

for determining relative risk ratios for subgroups of criteria.

46. The computerized system of Claim 45, wherein said means for comparing the relative risk ratio of the individual to the relative risk ratio of the risk class comprises means for comparing the relative risk ratio of the individual to one or more of the relative risk ratios determined for the subgroups of criteria.

SYSTEM AND METHOD FOR EVALUATING PREFERRED RISK DEFINITIONS

ABSTRACT OF THE DISCLOSURE

5

Express Mail No. EV 329 805 745 US
Docket No. 26893/82699

DECLARATION AND POWER OF ATTORNEY - PATENT APPLICATION

As a below named inventor, I hereby declare: that my citizenship, residence and post office address are as stated below. I believe I am the original, first and sole inventor (if only one is named below) or a joint inventor (if plural inventors are named below) of the invention entitled:

SYSTEM AND METHOD FOR EVALUATING PREFERRED RISK DEFINITIONS,

the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.. I acknowledge the duty to disclose information which is material to patentability in 37 C.F.R 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

Number	Country	Date (mm/dd/yyyy)	Priority Claimed?	Certified Copy Attached?
_____	_____	_____	☐Yes ☐ No	☐Yes ☐ No

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application No.	Date Filed (mm/dd/yyyy)
_____	_____

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed

in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

U.S. Parent Application or PCT Parent Number	Filing Date (mm/dd/yyyy)	Parent Patent No. (if applicable)

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are

punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statement may jeopardize the validity of the application or any patent issuing thereon.

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FWDS01 BBG 179867_1

FIG. 1

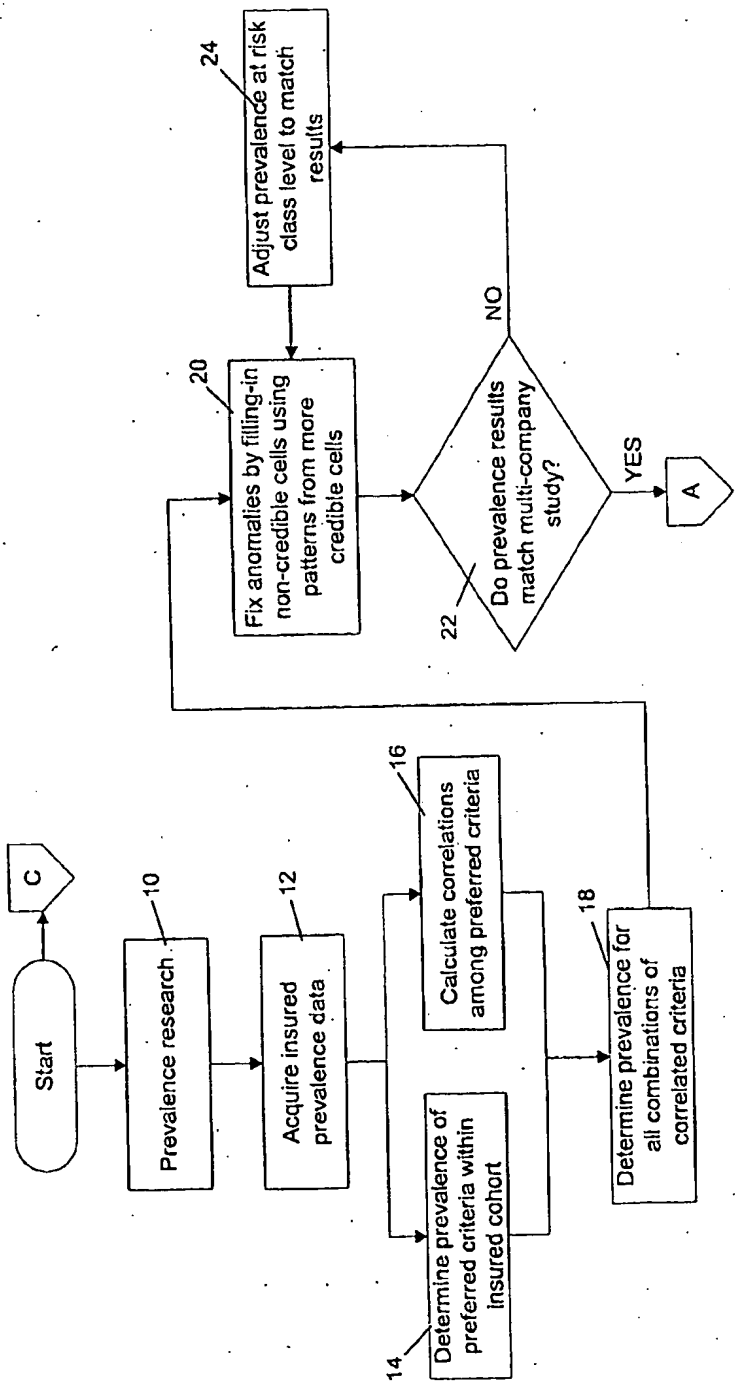

Start
C
Prevalence research
10
Acquire insured prevalence data
12
Determine prevalence of preferred criteria within insured cohort
14
Calculate correlations among preferred criteria
16
Determine prevalence for all combinations of correlated criteria
18
Fix anomalies by filling-in non-credible cells using patterns from more credible cells
20
Do prevalence results match multi-company study?
22
NO
YES
A
Adjust prevalence at risk class level to match results
24

FIG. 2

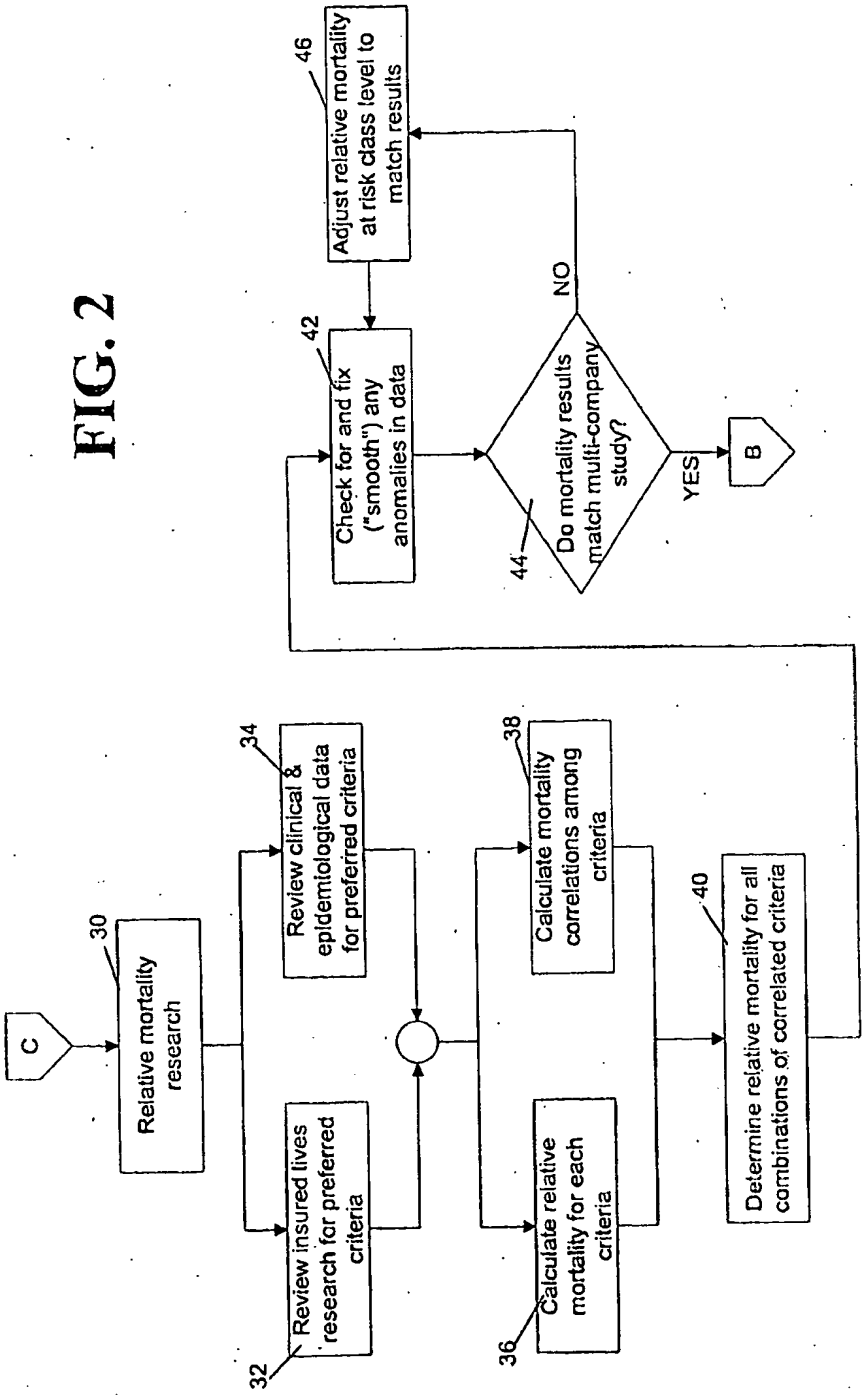

C
30
Relative mortality research
32
Review insured lives research for preferred criteria
34
Review clinical & epidemiological data for preferred criteria
36
Calculate relative mortality for each criteria
38
Calculate mortality correlations among criteria
40
Determine relative mortality for all combinations of correlated criteria
42
Check for and fix ("smooth") any anomalies in data
44
Do mortality results match multi-company study?
NO
YES
46
Adjust relative mortality at risk class level to match results
B

FIG. 3

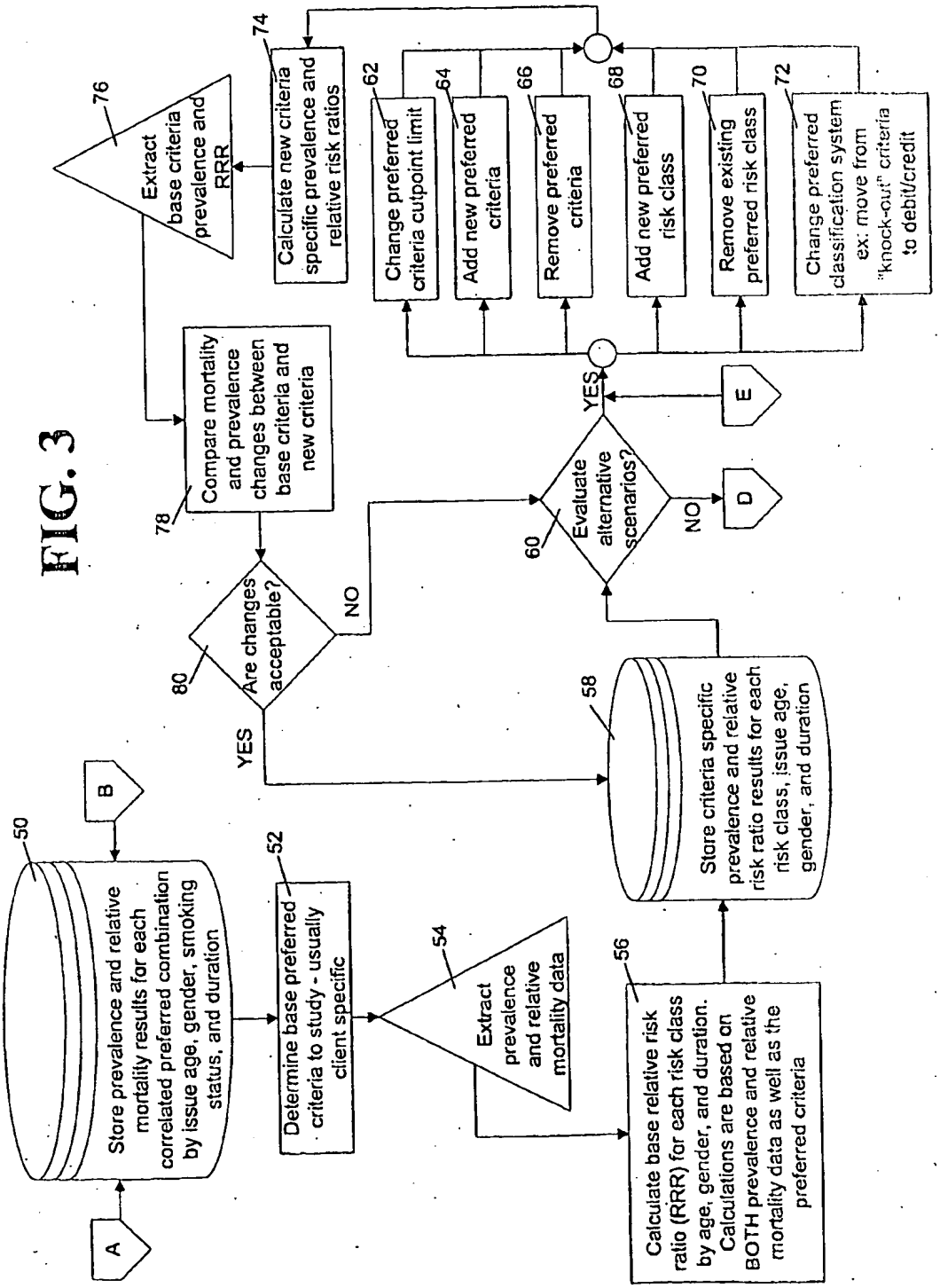
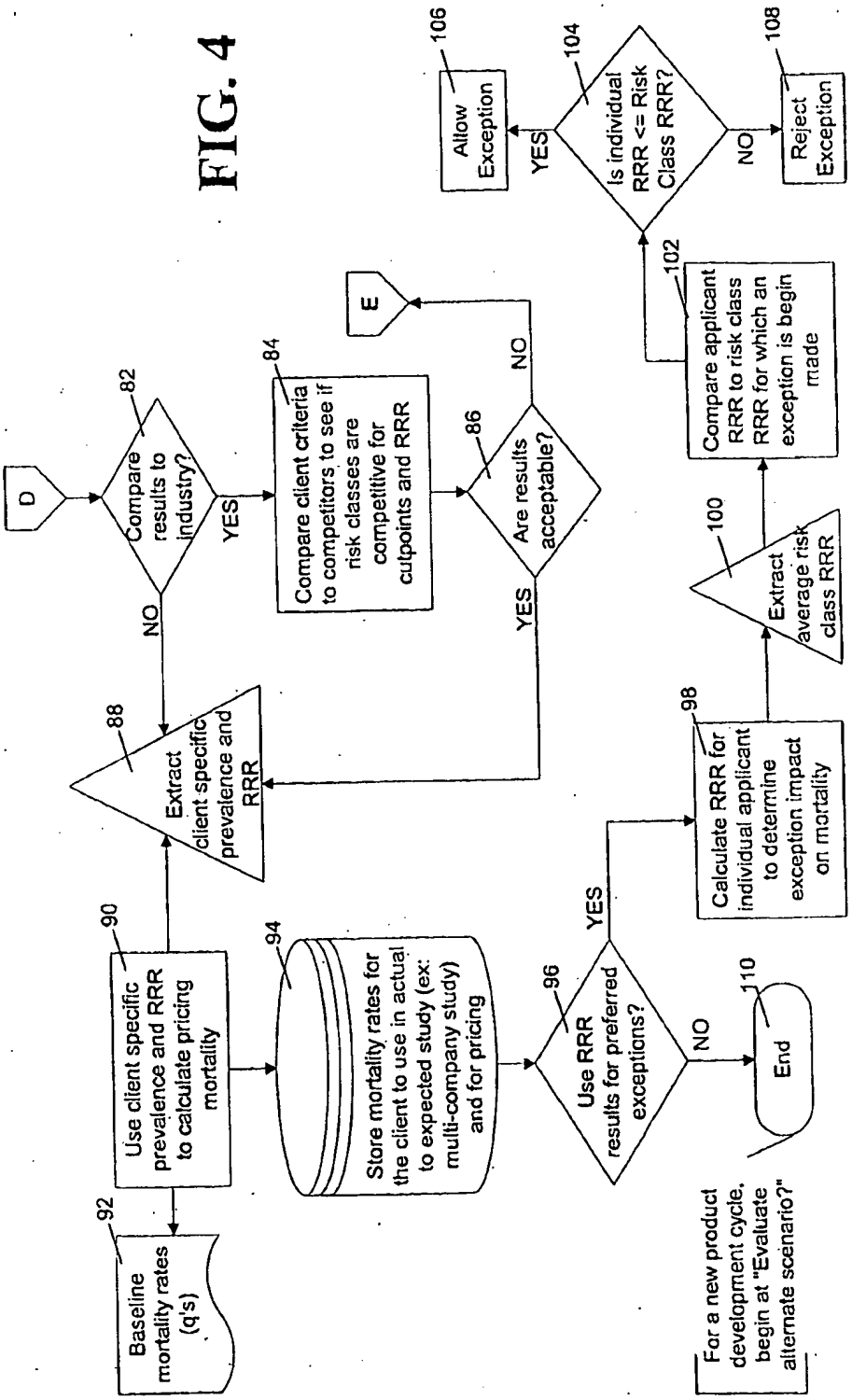

A
B
50
Store prevalence and relative mortality results for each correlated preferred combination by issue age, gender, smoking status, and duration
52
Determine base preferred criteria to study - usually client specific
54
Extract prevalence and relative mortality data
56
Calculate base relative risk ratio (RRR) for each risk class by age, gender, and duration. Calculations are based on BOTH prevalence and relative mortality data as well as the preferred criteria
58
Store criteria specific prevalence and relative risk ratio results for each risk class, issue age, gender, and duration
60
Evaluate alternative scenarios?
YES
NO
D
E
62
Change preferred criteria cutpoint limit
64
Add new preferred criteria
66
Remove preferred criteria
68
Add new preferred risk class
70
Remove existing preferred risk class
72
Change preferred classification system ex: move from "knock-out" criteria to debit/credit
74
Calculate new criteria specific prevalence and relative risk ratios
76
Extract base criteria prevalence and RRR
78
Compare mortality and prevalence changes between base criteria and new criteria
80
Are changes acceptable?
YES
NO

FIG. 4


D
82
Compare results to industry?
YES
NO
84
Compare client criteria to competitors to see if risk classes are competitive for cutpoints and RRR
86
Are results acceptable?
NO
YES
E
88
Extract client specific prevalence and RRR
90
Use client specific prevalence and RRR to calculate pricing mortality
92
Baseline mortality rates (q's)
94
Store mortality rates for the client to use in actual to expected study (ex: multi-company study) and for pricing
96
Use RRR results for preferred exceptions?
YES
NO
98
Calculate RRR for individual applicant to determine exception impact on mortality
100
Extract average risk class RRR
102
Compare applicant RRR to risk class RRR for which an exception is begin made
104
Is individual RRR <= Risk Class RRR?
YES
NO
106
Allow Exception
108
Reject Exception
110
End
For a new product development cycle, begin at "Evaluate alternate scenario?"